

INTRODUCTION

The U.S. Geological Survey is studying the regional ground-water flow system in the Cretaceous and Tertiary sand aquifers in the southeastern Coastal Plain of the United States. Parts of the states of Mississippi, Alabama, Georgia, and South Carolina are included in the study. Geologic analysis of the regional distribution of permeable clastic rocks in this area (Renken, 1984) suggests that in general the aquifer system can be divided into three aquifer units separated by confining units of highly variable permeability. A fourth aquifer unit that consists in places of limestone equivalent to parts of the Floridan aquifer system (Miller, 1984) and in other places of surfical sand mapped by Renken (1984) overlies much of the system. This fourth aguifer unit is a source of recharge to and discharge from the sand aquifer system but is not being considered in detail in this study. To avoid nomenclature and correlation problems from state to state, the aquifer and confining units of the system have been given alpha-numeric labels. A schematic classification of rock stratigraphic and regional hydrologic units for the Southeastern Coastal Plain aquifer system is shown in figure 1 (Renken, 1984). The upper most regionally-extensive group of aquifers selected for detailed hydrologic study and model simulation in the Southeastern Coastal Plain aquifer system has been designated aquifer unit A2. Sands within aquifer unit A2 are from rocks that have been identified at outcrop as being lower Tertiary, predominantly middle or lower Eocene and upper Paleocene with some younger units in the upper Eocene being included in Georgia and South Carolina. The outcrop of aquifer unit A2 is shaded on the

The purpose of this map is to show the estimated predevelopment potentiometric surface of aquifer unit A2 in the Southeastern Coastal Plain aquifer system. Waterlevel measurements used to draw the water-level contours range from the early 1900's to the 1980's. In all areas the earliest available water-level measurements were used; modern measurements were used only in those areas where there does not appear to be significant head decline due to man-induced stress. Because the water-level measurements were made at different times, the potentiometric map is not expected to show precise water levels at specific sites for a specific time--its purpose is to show an approximate water-level surface as it probably existed prior to development. Of necessity, the regional framework is greatly generalized and water levels associated with each layer will also be regionalized. It is, therefore, possible that water levels from individual aquifers will be lower or higher than the water levels shown on this map of the aquifer unit. On the map, contours stop at the updip boundries of outcrop areas. However in the real system, contours extend in a con-

No previous regional redevelopment potentiometric surface maps have been prepared for any units within the Southeastern Coastal Plain aquifer system.

tinuous way into the next lower unit.

SOURCE OF DATA

This map is a compilation of data from state groundwater studies, from previous reports, and from the files of the U.S. Geological Survey offices in Jackson, Miss.,

Tuscaloosa, Ala., Doraville, Ga., and Columbus, S.C. In Mississippi, the data were compiled from Stephenson and others (1928), Harvey and others (1961), Brown (1947), Gilliland and Harrelson (1980), Callahan (1971), and Lang and Boswell (1960). Data for Alabama came from reports prepared by Causey and McCain (1971), Davis (1980), Newton and McCain (1972), LaMoreaux and others (1957), Scott, McCain and Avrett (1967), Scott and others (1972), Scott, Golden, and Avrett (1967), Turner, Scott, Newton, Golden, and Avrett (1968), Turner, Scott, McCain, and Avrett (1968), Reed and others (1967), Reed and others (1968), Cagle and Newton (1963), Newton and others (1971), Davis and others (1980), Newton and others (1972), Newton, McCain, and Avrett (1968), and Newton, Golden, Avrett, and Scott (1968), and from office files. Data for Georgia came from reports prepared by Betchel Corporation (1972, 1973), LeGrand and Furcron (1956), Owen (1959, 1963a, 1963b), Faye and Prowell (1982), LeMoreaux (1946), LeGrand (1962), Stephenson and Veatch (1915), and Wait (1960a, 1960b, 1960c, 1963), and from office files. Data for South Carolina came from Siple (1951), Siple(1957), Siple and Koch(1965), U.S. Geological Survey (1971), Cooke (1936), Hayes (1979), and Park (1984), and from office files.

POTENTIOMETRIC SURFACE DELINEATION

The map is considered to be a reasonable estimate of the generalized predevelopment surface of the sand aguifer system aguifer unit A2. However, care should be taken in the use of the map because the measurements reflect different geologic units, time periods, and measuring conditions.

MAJOR FEATURES OF THE FLOW SYSTEM

In general, potentiometric highs result from recharge and lows result from discharge, with this discharge being most typically to rivers. Contour lines that curve upstream as they cross a river valley indicate aquifer discharge to the river. A notable example of this convex upstream curvature occurs across the Edisto River Valley in Barnwell, Orangeburg, and Bamburg Counties, S.C. Stream-aquifer interaction generally occurs in or near the outcrop--downdip of the outcrop where the unit is buried under younger sediments stream-aquifer interaction generally becomes less significant.

Water enters aguifer unit A2 as percolation from precipitation in the outcrop area and flows downgradient to streams, or downdip to deeply buried areas and, ultimately, to areas of upward leakage. In western Mississippi, water flows from the outcrop area to the Mississippi River; in eastern Mississippi, from the outcrop to the Tombigbee River. In Alabama, water flows from the outcrop area toward the Gulf of Mexico. In west Georgia (Randolph, Clay, Calhoun, and Early Counties), water flows from the outcrop southwest toward the Chatahoochee River; in eastern Georgia, from the outcrop southeast toward the Atlantic Ocean. In South Carolina, the direction of flow is southeast toward the Atlantic Ocean.

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APPROXIMATE POTENTIOMETRIC SURFACE FOR THE AQUIFER UNIT A2, SOUTHEASTERN COASTAL PLAIN AQUIFER SYSTEM OF THE UNITED STATES, PRIOR TO DEVELOPMENT

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